Austria, Italy, Sumatra, Java, and the East Indies. He first examines this mass of data for lunar periods. The synodic lunar month has an average length of 29.53059 days; the anomalistic month is 27.55457 days. The common period for these two is 411.7934 days. Within this interval the moon experiences the greatest disturbance in the form of its orbit, whose eccentricity varies between 0.044 and 0.066. Arranging his monthly data with reference to this period he finds that for six groups of stations in Prussia, Saxony, Austria, Italy, and Sumatra, the precipitation is a maximum when the perigee of the moon agrees with the lunar octant. For Java and Sumatra he had only sixteen years of observations, which was not quite long enough to demonstrate the action of the moon. His conclusions may be expressed in other words, as follows: The influence of the moon is such that the greatest rainfall occurs when the lunar perigee coincides with the full moon, and the least rainfall when the perigee coincides with the new moon. The excess when the perigee agreed with the full moon averaged about 10 millimeters in forty-one days, or 1 millimeter in four days, over the minimum rainfall when the perigee agreed with the new moon. In a second check computation Lamprecht considers only the number of the rainy and the dry months, calling those months rainy that had an excess of rain over the normal, and those dry that had a deficiency. He finds that 61 per cent of the months when the perigee agrees with the full moon are also wet months, leaving 38 per cent that do not agree with his previous conclusions. This is quite opposed to the hypothesis of Falb, according to whom the moon exerts its greatest influence in producing rain when the perigee agrees with the new moon. Having firm faith in the physical reality of the 411 or 412 day period, or 14-month period of the rainfall for Europe, Lamprecht assumes that it applies to the whole earth, and undertakes to explain the corresponding necessary action of the moon on the atmosphere in order to produce this period. He goes into a discussion of the zodiacal light considered as a ring of matter revolving around the earth and subject to perturbations from the moon, and urges that photographs of this light be obtained for further investigation. After some lucubrations on atmospheric electricity, he passes to the discussion of another period in the rainfall, namely, 423.82 days. This gives him for Europe a maximum rainfall at the middle of the period. The difference between the length of the lunar period, 411.79, and this new astronomical period, 423.82 days, is almost exactly twelve days, and the period common to them both is 39,732 years. Lamprecht says:

> I consider the period of 423.82 days as that in which the node of my hypothetical ring of matter circulating around the earth describes 360 degrees on the earth's equator, but it is very possible that my period is identical with Chandler's period in the variation of the earth's axis, so that this latter remarkable variation may be due to the oscillations of the ring of matter around the earth.

Lamprecht then passes to the study of a period of 11.8846 days, and considers that its existence is established with sufficient accuracy, and that it is caused by the synodic revolution of his ring around the earth. "In general, these various periods, and others that may be established, are the cause of the great variety of weather that we experience from day to day."

To this latter remark the Editor would offer the suggestion that by careful arrangement of data we may be able to work out an immense number of periods whereby to represent the occurrence of any series of phenomena; but we are not justified in saying that the periods cause the phenomena, or that the phenomena are the result of these periodicities. Who, for instance, would say that school children have a periodic tendency to go schoolward in the morning and homeward in the afternoon, and that their general behavior is the result of a number of such periodic tendencies? The fact is that they, like the rain and weather, are controlled by laws higher than mere arithmetic periodicities. The study of the fundamental laws of nature gives us a higher style of meteorology than the study of periodicities.

A MACHINE FOR CALCULATING PERIODICITIES.

Our readers are doubtless familiar with many forms of calculating machines; those for mere addition and multiplication are in use in every large counting house; the Hollerith machine, invented for the use of the United States Census Bureau, for the purpose of classifying and averaging a great variety of data, was recognized as a labor saving contrivance of immense importance. A desire has often been expressed for a machine that should discover recurring periods in any given series of numbers. The Editor has often worked over the sine and cosine formula for this purpose, but neither that or the purely arithmetical, nor the purely graphical methods are entirely satisfactory when we wish to discover wholly new periods. For this purpose Mr. Lamprecht tells us that he has used such a machine, and the Editor hopes to obtain a description of it for publication.

THE DEVELOPMENT OF THE KITE BY EUROPEAN SCIENTISTS.

Inasmuch as it has been remarked that the literature of science seems to offer but few memoirs that deal with the mechanics of the kite, it is, perhaps, worth while to call attention to those that have come to our notice. The name "kite," or "paper kite," as used in English; the cerf-volant, or flying stag of the French; the Fliegende Drache, or flying dragon of the Germans, and the *draco volans papyrus* of modern Latin, all point to the ancient custom of constructing these kites in fanciful imitation of animals; this custom was doubtless introduced into both Europe and China from some more ancient common source.

To the kindness of Professor Hellman, the Editor is indebted for a copy of a work in French whose title may be translated thus: A Memoir on Methods of Protection from Lightning inside of Dwellings, followed by a Letter on the Invention of the Electric Kite, with documents corroborative of this same letter by M. de Romas. Bordeaux, 1776.

This interesting book contains 20 pages of preface, 95 pages of the memoir, 49 pages of the letter followed by 12 pages of documents, to prove that M. de Romas invented or thought of the electric kite before Franklin applied it. It seems to be established that already, June 12, 1752, de Romas had written a letter recommending that the kite should be used to raise an iron bar as conductor in order to test the question whether the lightning was due to electricity, and that, furthermore, August 19, 1752, de Romas communicated to the Chevalier de Vivens the project that he had conceived of drawing electricity from the clouds by means of the kite, and that, furthermore, de Romas had, in August, 1752, commissioned Dutilh to construct an electric kite, but that the latter had delayed until the season for using it in 1752 had passed by, so that the first actual experiment made by de Romas was May 14, 1753, after he had heard of Franklin's success.

We are not at present interested so much in this question of priority in electrical discovery, as in collecting the scattered items that bear upon the history of the development of the structure of the kite, and the theory of the mechanical problems involved in flying it. Some such items were published in the MONTHLY WEATHER REVIEW during 1896, and the following items bearing upon these questions are extracted from various parts of de Romas' little volume:

DE ROMAS ON THE KITE.

De Romas' first kite appears to have been ready for use only a little while before its first use on May 14, 1753. A picture of it is given in his frontispiece and a description of the electrical attachments on pages 86–88. The shape reminds one of a boy's bow-kite with a long heavy tail, and it could not have flown very high, as de Romas says that he wound the string of his kite with a slender copper wire, so that when he flew the kite for the second time, June 17, 1753, the kite string itself gave out sparks 7 or 8 inches long.

On page 119, in the course of his letter addressed to the Author of the Journal Encyclopédique, de Romas quotes from his own first memoir, dated October 19, 1753, as follows:

A kite is to be constructed, that is to say, one of those frameworks covered with paper that are flown by youths; the bigger the framework is made the higher will it rise, because it will be able to sustain greater weight of string [and he then adds in a note, which must be considered as written in 1768, or possibly 1776] I have demonstrated that in order to raise the kite very high it is necessary that the dimensions of the surface should be proportionate to the length and thickness of the string. Of course, the longer and thicker the thread is so much the more will it weigh, and the more it weighs so much the more will it weigh down the kite. From this observation one may judge whether Franklin's kite composed of two sticks instead of two reeds, and of a silk handkerchief, no matter how large we may suppose it to have been, having openings in its tissue that would not be found in a sheet of paper, could, possibly attain to the height of the clouds, as Priestley in his history, said it did do.

In a note on page 129, de Romas quotes from Franklin's letter of July 29, 1750, where he recommends—

To stick a piece of pointed iron wire into the upper end of the kite in order to assure that as soon as any cloud full of lightnings should pass above the kite, the pointed iron wire would attract the electric fire from this cloud.

The picture of de Romas' kite, as shown in his frontispiece, shows that it was pointed at the lower and upper ends, and, although it may not have carried Franklin's electric needle, yet its pointed shape facilitated this electrical use. The theory of those days, according to which the kite collected the electricity of the cloud and the string conducted it downward, was subsequently dissipated by the experiments of Cavallo and his successors.

MUSSCHENBROEK'S THEORY OF THE KITE.

The first extended consideration of the theory of the action of the wind on the kite that the Editor is aware of is that published by J. A. Euler, eldest son of the famous Leonhard Euler, in the memoirs of the Berlin Academy of Sciences for 1756, some account of which will be given later. As this volume was not actually published until 1758, Euler was in fact preceded by Peter van Musschenbroek, the eminent professor at Leyden, who flew his kite in 1756–57; he died September 19, 1761, but his Introduction to Natural Philosophy was published posthumously in 1762, under the editorship of J. Lulof. We give Musschenbroek's theory in full, as translated from page 177, Article DLXXIII of Vol. I of the *Introductio ad Philosophia Naturalem*, by Peter van Musschenbroek, published in 1762, at Leyden, shortly after the death of this eminent philosopher. After treating of the composition and resolution of motions, Musschenbroek proceeds as follows (his figure is reproduced in our Fig. 1, Chart VII):

Article DLXXIII. Let us begin with an easy example, namely, with the paper kite which is carried up on high by the wind. To the central axis, AB, the loose cord, DEC, is fastened; if the string, EM, which is held by the hand, is fastened (at any intermediate point whatever, such as E), then when the cord makes the angle, DEC, equal to 54° 34′, the wind blows the kite horizontally with a maximum force and strikes AB obliquely. Let the perpendicular, OH, fall upon the line AB, it will express the direction and motion (pressure) of the kite; let the pressure, OH, be resolved into OP, parallel to the ground, and PH perpendicular to the ground; OP expresses the force due to the wind, with which the kite pushes horizontally, and PH the force by which it rises upward. By so much as the point E of the string approaches nearer to D, OP will decrease; therefore, the point E ought not to be fixed, but should be movable with respect to D according as the wind varies, for, if the wind blows gently, the point E should stay at the place where the angle, DEC, is 54° 34′, but if the wind blows violently, the point E is not proper, since the wind will tear the paper or break the string, EM; in this case the point E should be moved nearer to D, by which arrangement it is possible so to set the kite that the raging tempest shall neither tear it nor break the string, EM, or, if the kite is used by the philosopher to observe the electricity of the upper air, the slender iron wire, EM, will remain unbroken. Again, three forces are operative in the flying kite, viz, the pressure of the wind, the weight of the kite with its appended tail, and the pull by the sustaining hand, M. Therefore, if LG be a perpendicular to the string, LN parallel to the ground or perpendicular to the direction of gravity, and GN perpendicular to the direction of the wind, this triangle, GLN, expresses the magnitude of these three forces. Of these GL will be the pull on the string, LN the weight of the kite, GN the force of the wind; but, furthermore, on account of the curvature of the string, which is a catenary, GL differs at every intermediate point between E and M; whence it is evident that the strength of the string should be greater near the kite, at E, and less nearer M, and, therefore, the string rarely breaks near M, but in some intermediate place.

Article DLXXIV. It is now easy to see by what means ships driven by the same wind are made to describe very various paths. * * *

The author goes on to describe the play of forces involved in the sailing of a vessel, but we do not need to take up the subject.

DR. THOMAS YOUNG ON THE KITE.

The next reference to this subject is found in Dr. Thomas Young's course of Lectures on Natural Philosophy, London, 1807, Vol. I, p. 324, in the following words:

A kite affords a very familiar example of the effect of the oblique impulse of the air, of which the action first causes a pressure perpendicular to the surface of the kite, and this force combined with the resistance of the string, produces a vertical result capable of counteracting the weight of the kite.

Young's figure, 294, Plate XXII is reproduced in our Fig. 3, Chart VII. His explanation accompanying this diagram says:

A kite supported by the wind of which the force acts nearly in the line, AB, perpendicular to the surface of the kite, and this compounded with the force of the cord, AC, produces the resultant AD, which sustains the weight of the kite.

It is evident that Young has by construction forced the resultant AD to be vertical, which is only the case when the head resistance is properly counterbalanced. He assumes that A is the common center of pressure, center of gravity, and point of application of the pull on the line and that there is no component of the wind force in the plane of the kite; nevertheless, so far as he goes into the details of the complex interaction of forces his analysis is an improvement on Musschenbroek.

BRANDES ON THE KITE.

After the above writings we find nothing on the theory of the kite until we come to the article by Brandes in the second volume of the third edition of Gehler's *Physikalisches Worterbuch*, published at Leipsic in 1826. A few words are given by Brandes as to the early history of the kite. It was described as a plaything by Daniel Schwenter (*Mathematische Erquickstunden*, Nurnberg, 1651, Part I, p. 472), who also showed how to construct a kite in imitation of a real dragon, and in this matter referred to an earlier author, Jacob Wecker (*In Secretis*, p. 187). Brandes refers to Musschenbroek's explanation of the action of the wind on the kite, which we have just given in full, and then goes on to give an explanation which is apparently intended to be a reproduction from Musschenbroek, but as it varies somewhat from him, we will reproduce the following text of Brandes (his figure is reproduced in our Fig. 3, Chart VII):

Let the loose cord DEC [this is now technically termed the bridle—ED.] be fastened to the main rib, AB. If now at any point, E, of the bridle the main string, EM, be fastened and held in the hand at M, while the surface of the kite makes an acute angle, OPH, with the horizontal direction of the wind, OP, then the pressure of the wind, OP, against the center of gravity, O, may be decomposed into two parts, OH and HP. If now we assume that the kite is held fast by this string, EM, then the component, OH, of this pressure experiences a resistance that it can not overcome, so that the kite can only follow the force PH, and, therefore, must ascend, but not, however, with the whole force of the wind, but only with the fraction, $PH \div PO$, of the whole wind. Therefore, the ascent of the kite can only become possible when the surface of the kite is exposed not directly to the wind, but like the sails of a windmill inclined to the wind and in this case the effect of the wind is greatest when the line drawn normal to the surface of the kite makes an angle of 54° 34′ with the direction of the wind. The string is, at the beginning, pulled hard and one runs with it against the wind in order to increase the pressure of the wind against the surface of the kite. Kites of this kind flown with a long string are driven by the wind to very considerable altitudes.

It is evident that Brandes' argument is defective. He seems to say that $P\ O$ represents the pressure of the wind against the center of the kite, but he does not represent $O\ P$ as being normal to the surface of the kite, and after he has resolved this into two elements, it is evident that one of these is normal, acting in the direction from O to H, while the other is parallel to $A\ B$ and acts in the direction from H toward P, consequently this latter component, instead of raising the kite, must drive it downward in the direction $H\ P$, and therefore bring it to the ground. The true analysis of the forces is as given by Musschenbroek and Young; the wind, when it strikes the surface of the kite, is deflected and can only move in the direction from A to B, and exerts both a small head pressure and a strong normal pressure upon the surface of the kite, therefore, $O\ H$ and $H\ P$ must represent these pressures, and it is $O\ P$ that must be resolved into vertical and horizontal elements. It is possible that Brandes was led into error by following the mistake of the draughtsman who copied Musschenbroek's figure, as the two figures are lettered alike and differ only in the perpendicularity of the line $P\ H$. We have reproduced them both in Figs. 1 and 3, respectively.

After describing the first experiments of Franklin and the remarkable work done by de Romas in applying the kite to electrical observations, followed by similar work by several others, Brandes mentions that Musschenbroek, in 1756 and 1757, raised a kite to an altitude of 700 feet above the ground, see Musschenbroek's *Introductio ad Philosophia Naturalem*, Tome I, page 295, and adds, finally:

That Dr. John Cuthbertson has described a special, rather complicated arrangement, and illustrated it on a special copper plate engraving, for causing the kite to ascend with convenience and certainty. But small balloons filled with illuminating gas, such as can be made of considerable size out of gold beaters' skin would offer still better service.

In the Encyclopedia Britannica, eighth edition, Vol. VIII, 1855, page 608, Sir David Brewster, in speaking of the electrical kite, says:

Mr. Cuthbertson sometimes found it necessary to use three kites all connected together. On one occasion, when he could collect no electricity from the atmosphere with a kite having a string 500 feet long, he succeeded in obtaining it by adding two other kites, each of which had strings of the same length. Mr. Cuthbertson likewise employed an apparatus for raising his kites, in which the strings were lengthened or shortened by coiling them around a drum.

It will be remembered that for these electrical experiments the kite string was rather loosely wound around by a light copper wire, for the purpose of conducting the electricity from the clouds as was at first supposed, although afterwards Cavallo perceived that electricity was also drawn from the air when no clouds were present, so that he introduced the idea of the electricity of the clear atmosphere as distinguished from that of the thundercloud; subsequent progress showed that we might consider the electricity as developed within the wire itself by the inductive action of either the earth or the atmosphere or the cloud and not necessarily conducted from cloud or air to the earth. For our present study, however, which is concerned only with the development of the kite as a mechanism, we note merely that the small height, 500 feet or more, attained was largely due to heavy weight carried by his kite string. We note also that Cuthbertson seems to have been the first after Alexander Wilson to attempt to reach great altitudes by means of a tandem of kites.

CAVALLO'S EXPERIMENTS WITH KITES.

The Editor regrets that he has not access to the original memoir by Cuthbertson, but, on the other hand, the following extracts from his contemporary, Tiberius Cavallo, give a good idea of the construction, use, and mechanical theory of the kite as it was then understood. These extracts are taken from the first chapter in Vol. II of A Complete Treatise on Electricity, in Theory and Practice, with original experiments, by Tiberius Cavallo, F. R. S., the fourth edition, in three volumes, London, 1795. There is nothing to show that this portion of this edition differs materially from the first edition published in 1777.

The first instrument that I made use of to observe the electricity of the atmosphere was an electrical kite, which I had constructed, not with a view to observe the electricity of the air (for this, I thought, was very weak and seldom to be observed), but as an instrument which could be occasionally used in time of a thunderstorm in order to observe the electricity of the clouds. The kite, however, being just finished, together with its string, which contained a brass wire through its whole length, I raised it on the 31st of August, 1775, at seven of the clock in the afternoon, the weather being a little cloudy, and the wind just sufficient for the purpose. The extremity of the string being insulated I applied my fingers to it, which, contrary to my expectations, drew very vivid and pungent sparks; I charged a coated phial at the string several times, but I did not then observe the quality of the electricity. This successful experiment induced me to raise the kite very often and to keep it up for several hours together, thinking that if any periodical electricity or any change of its quality took place in the atmosphere it might very probably be discovered by this instrument. In the following two chapters I shall describe the construction of the electrical kite, with its appurtenances; and shall transcribe the most remarkable part of my journal relative to the kite, *i. e.*, describing such experiments only as are most remarkable and do not happen very commonly; for although I have used my kite sometimes ten and more times in a week, and at any hour of the day or night, yet as the greatest part of those experiments are only of use to confirm a few laws of atmospherical electricity, I shall omit their particular detail, and shall only subjoin those laws at the end of the second chapter.

The first electrical kite that I constructed was 7 feet high, and it was made of paper, with a stick or straighter, *i. e.*, a central rib and a canebow, like the kites commonly used by schoolboys. On the upper part of the straiter I fixed an iron spike, projecting about a foot above the kite, which I then thought was absolutely necessary to collect the electricity; and I covered the paper of the kite with turpentine, in order to defend it from the rain. The kite, perfect as I thought it to be in its construction, and fit for the experiments for which it was intended, soon manifested its imperfections, and after having been raised a few times, it became quite unfit for further use; it being so large, and consequently heavy, that it could not be used, except when the wind was strong, and then, after much trouble in raising and drawing it in, it often received some damage, which soon obliged me to construct other kites upon a different plan, in order to ascertain which method would answer the best for my purpose. I gradually lessened their size, and varied their form, till I observed, upon trial that a common schoolboy's kite was as good an electrical kite as mine. In consequence of which I constructed my kites in the most simple manner, and in nothing different from the children's kites, except that I covered them with varnish, or with well-boiled linseed oil, in order to defend them from the rain; and I covered the back part of the straiter with tinfoil, which, however, has not the least power to increase its electricity. I also furnish the upper extremity of the straiter with a slender wire pointed, which, in time of a thunderstorm, may perhaps draw the electricity from the clouds somewhat more effectually; but, in general, I find, as it will appear in the account of the experiments, that it does not in the least affect the electricity at the string. The kites that I have generally used are about 4 feet high and little above 2 feet wide. This size, I find, is the most convenient, because it renders them easy to be managed, and, at the same time, they can draw a sufficient quantity of string. As for silk or linen kites, they require a good deal of wind to be raised; and then they are not so cheap, or so easy to be made, as paper kites are. The string sometimes breaks, and the kite is lost or broken; for which reason these kites should be made as cheap and as simple as possible.

The string is the most material part of this apparatus, for the electricity produced is more or less, according as the string is a better or a worse conductor. The string which I made for my large kite consisted of two threads of common twine, twisted together with a brass wire between the strands. This string served very well for two or three trials, but on examination I soon found that the wire in it was broken in many places, and it was continually snapping; the metallic continuation, therefore, being so soon interrupted, the string soon became so bad that it acted nothing better than common twine without a wire. I attempted to mend it by joining the broken pieces of wire, and working into the twine another wire, which proved a very laborious work, but the remedy had very little effect, the wire breaking again after the first trial, which determined me to adopt other methods, and, after several experiments I found that the best string was one which I made by twisting a copper thread[1] with two very thin threads of twine. Strings like this I have used for the greatest part of my experiments with the kite, and I find them to be exceedingly useful and fit for the purpose. Silver or gold threads would do much better to twist with the twine because they are much thinner than copper thread, and in consequence, the string would be much lighter, but at the same time it is to be considered that gold or silver thread is much dearer than copper thread.

I have attempted to render the twine a good conductor of electricity by covering it with conducting substances, as lamp black, powder of charcoal, very fine emery, and other substances, mixing them with diluted gum water; but this method improves the string very little, and for a short time, for the said conducting substances are soon rubbed off the twine. Mr. Nairne informed me that he used to soak the string of his electrical kite in a strong solution of salt, which rendered it a good conductor, so far as it attracted the moisture of the air. In consequence of this information I soaked in salt water a long piece of twine, and by raising a kite with it I found that it conducted the electricity pretty well, but I thought it much inferior to the above-described string with the copper thread, besides the salted string in wet weather not only leaves part of the salt upon the hands of the operator, and in consequence renders them unfit to manage the rest of the apparatus, but it marks a white spot wherever it touches the clothes.

In raising the kite when the weather is very cloudy and rainy, in which time there is fear of meeting with great quantity of electricity, I generally use, to hang upon the string, the hook of a chain, the other extremity of which falls upon the ground. Sometimes I use another caution besides, which is to stand upon an insulating stool, in which situation I think that if any great quantity of electricity, suddenly discharged by the clouds, strikes the kite, it can not much affect my person. As to insulated reels and such like instruments that some gentlemen have used to raise the kite without danger of receiving any shock, fit for the purpose as they may appear to be in theory, they are yet very inconvenient to be managed. Except the kite be raised in time of a thunderstorm, there is no great danger for the operator to receive any shock. Although I have raised my electrical kite hundreds of times without any caution whatever, I have very seldom received a few exceedingly slight shocks in my arms. In time of a thunderstorm, if the kite has not been raised before, I would not advise a person to raise it while the stormy clouds are just overhead, the danger in such time being very great, even with the precautions above mentioned. At that time, without raising the kite, the electricity of the clouds may be observed by a cork-ball electrometer held in the hand in an open place, or, if it rains, by my electrometer for the rain, which will be described hereafter.

The experiments made by Cavallo with the above kite are given in full from September 2, 1775, to January 8, 1777, from which we cull only the following: He demonstrates that it was the string and not the kite that collects the electricity from the air, and, again, that for the same length of string the index of his electrometer rose higher in proportion as the kite came nearer to the zenith, but the angular distance from the zenith is not given, so that we can not infer anything as to the angle of efficiency of his kites.

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of Senor Mariano Bárcena, director, and Senor José Zendejas, vice-director, of the Central Meteorologico-Magnetic Observatory, the summaries of Mexican data for the months of January and February have been communicated in manuscript, in advance of their publication in the *Boletin Mensual;* an abstract translated into English measures is here given in continuation of the similar tables published in the MONTHLY WEATHER REVIEW during 1896. The altitudes occasionally differ from those heretofore published, but no reason has been assigned for these changes. The barometric means have not been reduced to standard gravity, but this correction will be given at some future date when the pressures are published on our Chart III.

[1] I mean such a thread of copper as is used for trimmings, etc., in imitation of gold threads, which are nothing more than silk or linen threads covered with a thin lamina of copper.

Mexican data for January, 1897.

Stations.	Altitude.	Mean barometer.	Temperature. Max.	Temperature. Min.	Temperature. Mean.	Relative humidity.	Precipitation.	Prevailing direction. Wind.	Prevailing direction. Cloud.
	Feet.	Inch.	° F.	° F.	° F.	%	Inch.		
Aguascalientes	6,112	23.80	73.4	35.6	55.4	50	4.72	n.	sw.
Campeche									
Colima (Seminario)	1,663				73.2				
Colima									
Culiacan	112								
Guadalajara (O. d. E.)	5,141	24.98	79.9	34.2	57.7	86	0.19	nnw.	w.
Guanajuato	6,761								
Jalapa	4,757	25.56	88.2	41.5	57.7	85	2.98	n.	
Lagos (L. G.)	6,275	24.14	77.9	28.7	55.0	57	0.63	sw.	sw.
Leon	5,901	24.30	76.8	34.3	56.8	50	0.50	ssw.	sw.
Magdalena (Sonora)	4,948				52.3		6.46	s.	w.
Mazatlan	25								
Merida	50	30.01	91.2	54.5	72.0	74	2.95	ne.	se.
Mexico (Obs. Cent.)	7,472	23.06	74.5	37.0	55.9	49	0.15	sw.	sw.
Mexico (E. N. de S.)	7,480								
Monterey	1,626	28.24	77.0	23.9	55.4	77	1.44	ne.	ne.
Morelia (Seminario)	6,401	23.96	75.1	37.4	55.6	63	0.72	ssw.	w.
Oaxaca	5,164	25.10	82.6	39.4	63.3	56	T.	nw.	
Pabellon	6,312								
Pachuca	7,956	22.54	80.2	34.9	54.0	59	0.22	nne.	sw.
Puebla (Col. d. Est)	7,118								
Puebla (Col. Cat.)	7,112	23.38	76.1	39.9	56.8	46	0.04	ese.	sw.
Queretaro	6,070								
Real del Monte	9,095								
Saltillo (Col. S. Juan)	5,377	24.89	74.8	21.2	50.4	67	3.66	n.	n.
San Jacinto (E. N. d. A.)	7,438								
San Luis Potosi	6,202	24.13	73.0	37.4	54.1	68	1.04	sw.	w.
Silao	6,063	24.28	72.7	44.8	59.0	62	0.44		
Tacámbaro									
Tacubaya (Obs. Nac.)	7,620								
Tampico (Hos. Mil.)	38								
Tehuacan	5,453								
Toluca	8,812	21.89	71.4	31.6	50.2	54	0.33	se.	
Trejo (H. de, S., Gto.)*	6,011						0.46		
Trinidad †	6,011								
Veracruz	48								
Zacatecas	8,015	23.49	75.2	29.8	51.8	52	1.24	sw.	sw.
Zapotlan (Seminario)	5,125	25.08	80.6	44.4	62.4	62	0.42	se.	sw., se.

* Trejo appears to have the same altitude as the next station, Trinidad, but this may be a typographical error as in the December *Boletin*. See MONTHLY WEATHER REVIEW, January, 1897, page 17.

† Trinidad is 14 kilometers east-southeast of Leon.

Mexican data for February, 1897.

Stations.	Altitude.	Mean barometer.	Temperature. Max.	Temperature. Min.	Temperature. Mean.	Relative humidity.	Precipitation.	Prevailing direction. Wind.	Prevailing direction. Cloud.
	Feet.	Inch.	° F.	° F.	° F.	%	Inch.		
Aguascalientes	6,112								
Campeche									
Colima (Seminario)	1,663	28.29	96.4	46.8	72.1	61	0.03	wsw.	sw.
Colima					74.8				
Culiacan	112	29.81	90.1	50.0	60.7	58	0.00		
Guadalajara (O. d. E.)	5,141	24.98	87.3	35.8	62.4	79	0.00	sw.	sw.
Guanajuato	6,761								
Jalapa	4,757	25.52	77.0	55.4	64.6	72	0.72	se.	
Lagos (L. G.)	6,275	24.13	87.8	30.2	59.0	42	T.	nw.	sw.
Leon	5,901	24.29	84.2	34.7	60.4	36	T.	sw.	sw.
Magdalena (Sonora)	4,948				54.9		0.24	n.	n.
Mazatlan	25	29.96	77.4	54.9	69.8	70	0.00	nw.	sw.
Merida	50	29.94	95.2	58.6	77.0	70	0.03	se.	se.
Mexico (Obs. Cent.)	7,472	23.06	73.9	46.9	60.1	41	0.00	se.	sw.
Mexico (E. N. de S.)	7,480								
Monterey	1,626	28.09	95.0	41.0	65.8	59	T.	ne.	ne.
Morelia (Seminario)	6,401	23.96	85.8	38.5	61.9	52	0.00	ssw.	wsw.
Oaxaca	5,164	25.06	90.0	42.2	67.5	55	0.00	nw.	ne.
Pabellon	6,312								
Pachuca	7,956								
Progreso									
Puebla (Col. d. Est.)	7,118								
Puebla (Col. Cat.)	7,112	23.37	83.3	38.8	61.0	44	0.00	e.	sw.
Queretaro	6.070								
Real del Monte	9,095								
Saltillo (Col. S. Juan)	5,377	24.78	85.3	37.7	58.3	50	0.04	s.	sw.
San Jacinto (E. N. d. A.)	7,438	23.05	72.1	37.8	59.5	47	0.00	sw.	n. w.
San Luis Potosi	6,202	24.11	81.5	39.6	60.8	63	T.	sw.	w.
Silao	6,063	24.28	79.7	43.3	62.8	50	T.	nw.	sw.
Tacambaro									
Tacubaya (Obs. Nac.)	7,620								
Tampico (Hos. Mil.)	38								
Tehuacan	5,453								
Toluca	8,812	21.93	76.6	28.6	54.5	48	0.00	sw.	
Trejo (H. d. S., Gto.)	6,011						0.00		
Trinidad	6,011								
Vera Cruz	48								
Zacatecas	8,015	22.50	68.5	42.3	55.6	42	0.00	sw.	
Zapotlan (Seminario)	5,125	25.08	87.4	43.5	65.1	48	0.05	sse.	sw.

CHEMICAL COMPOSITION OF THE UPPER AIR.

The second series of simultaneous balloon ascensions in the interest of meteorology was carried out on the 18th of February. The balloon, L'Aerophile, which ascended at

Chart VII. Illustrating the Mechanics of the Kite.